



The Solutions Network
Rochester, New York

UESC SUCCESS STORY NAVSTA, GREAT LAKES, IL


IN COLLABORATION WITH COMED
(AMERESCO ENERGY SERVICES COMPANY)

Presented by
GEORGE WOKOMA & RICK RODRIGUEZ




AGENDA

- ❖ The Site: Naval Station, Great Lakes, IL
- ❖ UESC – Why & How
- ❖ 3 Step Implementation Plan
- ❖ UESC Projects
- ❖ Impact of UESC on Energy/Cost
- ❖ Impact of New Construction
- ❖ Current Utility & Cogen Projects, Phases (9a&b)
- ❖ Our Next Project
- ❖ Benefits
- ❖ Lessons Learned



THE SITE


- ❖ Naval Station, Great Lakes, IL
 - Located 35 miles North of Chicago
 - About 278 buildings
 - 10.837 Million Square Feet of Occupied Space
 - Largest US Navy Recruit Training Center



UESC WHY & HOW

- ❖ REASONS FOR CONSERVATION EFFORTS
 - EPAAct of 1992
 - Executive Orders: 12902,13123
 - Mandates: 30% & 35% energy use reductions by 2005 and 2010 respectfully using 1985 as base line
 - Instructions: OPNAVINST 4100-5D, NAVSTAINST 11300.1F
 - Energy Audits: Findings and Recommendations
 - Deferred facilities maintenance
 - Many energy/cost reduction opportunities


August 8-11, 2004
 4



WHY UESC?

- Streamlined procurement process
- Saves time
- Flexible contracts
- Payment through utility budget appropriations
- No direct appropriations needed
- Up front financing by the utility
- Local utility willing to participate
- Relationship with a long standing utility
- One-stop shopping for a turnkey project
- Water savings projects also included
- Capital improvement helps upgrade equipment and facilities


August 8-11, 2004
 5



WHY UESC?

- ❖ Financing provided by ComEd
 - Aerage of 10% buy down
- ❖ Repayment terms range from 10 to 15 years with annual payments
- ❖ Financing rate spread agreed to in BOA
- ❖ Savings exceed payments by at least 10%

August 8-11, 2004
 6




UESC HOW?

❖ BASE WIDE ENERGY SURVEY

- Local Utilities were solicited in 1996 for their interest in DSM (now UESC)
- Two companies, ComEd and North Shore Gas conducted base wide energy survey
- ComEd proposed efficiency in the facilities and infrastructures
- North Shore Gas proposed decentralization of the central heating plant
- Potential for energy conservation and costs savings existed with ComEd's survey
- North Shore's survey was shelved for further studies (mainly due to cost)

August 8-11, 2004
7




UESC HOW?

ROLES AND RESPONSIBILITIES

■ <u>COMED</u>	■ <u>GOVERNMENT</u>
+ Energy survey/audit	+ NAVSTA -Manages
+ Feasibility study	+ NFESC SOUTH DIV (Engineering & economic overview)
+ Eng & economic analysis	+ EFA MW - Contracting
+ Design	+ EFA MW -Project management
+ Financing	+ NETC (CNI) - Final Approval
+ Installation	+ Comptroller – Pays up
+ Warranty	


August 8-11, 2004
8



3 STEP IMPLEMENTATION PLAN

- ❖ In 1996 NAVSTA signed a UESC agreement with ComEd to implement energy and water conservation projects in 3 steps:
 - Step 1; Implement base wide facilities efficiency project and reduce water utilization and sewage production
 - Step 2; Upgrade utility distribution systems
 - Step 3; Upgrade/right-size the central plant

August 8-11, 2004
9



UESC PROJECTS

- July 1996 first major energy conservation project included energy efficiency upgrades for 6 buildings at NS, Great Lakes
- 1996-2003, 8 task orders (Phases) have been awarded to ComEd, under GSA Areawide Contract.
- Projects done include: HVAC, Direct Digital Controls (DDC), Lighting upgrade, Steam Traps, Steam line insulation, Heat Exchangers, chiller repair, Various Retrofits/Upgrades for 153 buildings.
- Phase 9 (Cogeneration Plant) Utility Distribution and Central Plant Upgrade are in construction

August 8-11, 2004
10




UESC PROJECTS




- ❖ Lighting Retrofit
- ❖ Lamp & Ballast Standardization
- ❖ Improved Lighting Quality
- ❖ LED Exit Signs

August 8-11, 2004
11




UESC PROJECTS




- ❖ Building Control Systems
- ❖ Direct Digital Control
- ❖ Pneumatic Component Repair/Replacement
- ❖ Energy Efficient Control Strategies Including:
 - Economizers
 - Optimal Start/Stop
 - Night Setback

August 8-11, 2004
12



UESC PROJECTS



- ❖ Chiller & Refrigeration System Upgrade
- ❖ Energy Efficient Chillers
- ❖ Environmentally Friendly Refrigerants
- ❖ Variable Speed Pumping
- ❖ Rack Refrigeration Systems

August 8-11, 2004

13



UESC PROJECTS



- ❖ Steam System Upgrades
 - Pipe Insulation
 - Steam Trap Testing & Replacement
 - Heat Exchanger Cleaning & Upgrades
- ❖ Radiant Heating Systems

August 8-11, 2004

14




UESC PROJECTS



- ❖ Air Handling Unit Upgrades
- ❖ Roof Top Unit Replacement
- ❖ Variable Speed Fans
- ❖ High Efficiency Motors

August 8-11, 2004

15



SUMMARY OF PROJECTS

- ❖ 635 Energy Conservation Measures
- ❖ 153 Buildings
- ❖ Replaced/Retrofitted 63,449 Light Fixtures
- ❖ Tested 2,687 Steam Traps and Replaced 530
- ❖ 17 Buildings Converted to Variable Air Volume
- ❖ Replaced 77 AHU's/RTU's
- ❖ Replaced 13 Large Chillers
- ❖ Removed the Equivalent of 83,229 tons of CO₂, 1,226 tons of SO₂ and 439 tons of NO_x per year in Illinois


August 8-11, 2004
16



SUMMARY OF PROJECTS

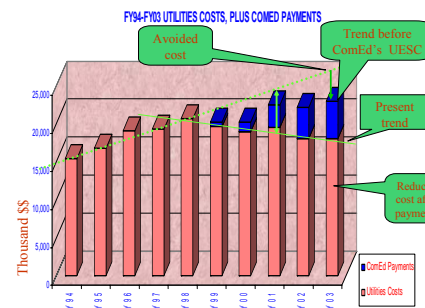
Great Lakes UESC Energy Conservation Projects						
Contract Date	Project	Project Completion	Energy Savings Mbtu	Installed Cost	Cost Savings	Payback
13-May-97	Phase I - 6 Bldgs	Feb-98	9,091	\$1,231,014	\$219,101	5.62
31-Dec-97	Hosp Ph. A-200H	May-98	10,197	\$1,767,681	\$234,005	7.55
6-Feb-98	Phase II - 20 Bldgs	Jan-99	71,577	\$8,234,242	\$1,271,242	6.48
18-Dec-98	Phase III - 20 Bldgs	Dec-99	\$7,244	\$7,591,274	\$914,242	8.30
27-May-99	Phase IV - 30 Bldgs	Feb-00	74,177	\$8,075,733	\$1,163,717	6.94
5-Jan-00	Phase V - 20 Bldgs	Dec-01	61,100	\$8,668,278	\$946,286	9.16
7-Aug-00	Phase VI - 20 Bldgs	Dec-01	78,375	\$8,680,256	\$1,187,998	7.31
15-Dec-00	Total VII - 9 Bldgs	Jun-02	99,179	\$7,817,703	\$988,492	7.91
31-Dec-01	Phase VIII - 35 Bldgs	Dec-02	55,368	\$5,259,558	\$746,399	7.05
Summary			\$16,308	\$57,325,739	\$7,671,471	7.47

August 8-11

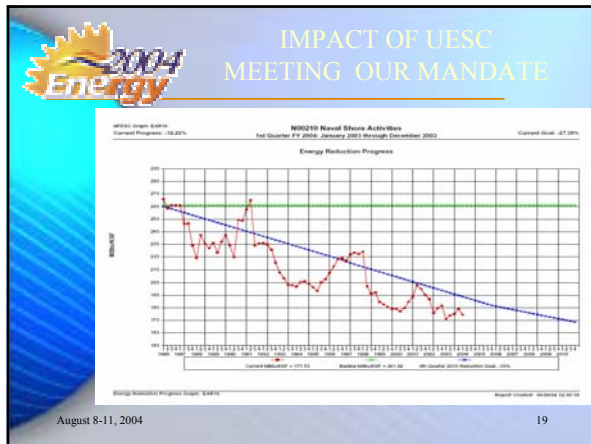


IMPACT OF UESC CONTROL/REDUCTION COST

FY94-FY03 UTILITIES COSTS, PLUS COMED PAYMENTS



August 8-11, 2004









IMPACT OF NEW CONSTRUCTION RTC

Drill Hall, Showing Interior



Air Conditioned

August 8-11, 2004

22



CURRENT UTILITY & COGEN PROJECTS

- ❖ Phase 9a
 - Steam and Condensate Line Replacement
 - Boiler Fan VSD's in Central Plant
 - Network Enhancement & Boiler Controls Upgrade in Central Plant
- ❖ Phase 9b
 - Cogeneration System
 - Back Fuel Oil Conversion

August 8-11, 2004

23



CURRENT UTILITY & COGEN PROJECTS

- ❖ Replace 2 miles of steam and condensate lines
- ❖ Re-insulate steam piping



STEAM & CONDENSATE LINE REPLACEMENT

August 8-11, 2004

24




CURRENT UTILITY & COGEN PROJECTS

- ❖ Convert Make-up air flow to variable speed on Boilers #4 & #6




August 8-11, 2004

25



NETWORK ENHANCEMENT & BOILER CONTROLS UPGRADE

- ❖ Upgrade controls on Boiler #4
- ❖ Design and install network for all Central Plant controls



August 8-11, 2004

26



PHASE 9a PROJECT SUMMARY

- ❖ Investment: \$8,400,000
- ❖ Simple Payback: 9.4 years
- ❖ Project Completed January 04

August 8-11, 2004

27




PHASE 9b COGENERATION


- ❖ Replace three 50,000 lb/hr boiler, built in the early 40's, with two 5.5 Mw Solar gas turbines
- ❖ System includes two 26,000 lbs/hr Heat Recovery Steam Generators (HRSG's) and two 24,000 lbs/hr duct burners
- ❖ Install two 2 Mw internal combustion (IC) diesel generators for back up
- ❖ True base load system

August 8-11, 2004

28




PHASE 9b COGENERATION




August 8-11, 2004

29




PHASE 9b COGENERATION



Demo Work to Drop-in Equipment Through Roof


August 8-11, 2004

30




PHASE 9b FUEL OIL CONVERSION

- ❖ Replace #6 Fuel Oil with #2 Fuel Oil
- ❖ Replace fuel oil delivery system
- ❖ Clean and reuse existing fuel oil tanks



August 8-11, 2004

31




NEXT PROJECT PHAS10 IN PROGRESS

- ❖ Lighting Occupancy Sensors
- ❖ Water Conservation
- ❖ Vending Machine Miser
- ❖ HVAC Upgrades
- ❖ PV Cell Initiative
- ❖ DDC/Fiber Optic Interface
- ❖ More Lighting Upgrade

August 8-11, 2004

32



BENEFITS TO NSGL

- ❖ Meeting Federal Conservation Mandates
- ❖ Reduction in Procurement Time
- ❖ Reduction in O&M Costs While Improving Efficiencies
- ❖ Better Approach Using Comprehensive Total Solution Focus
- ❖ Upfront Financing of Improvements Provided by ComEd/Ameresco
- ❖ Improved Facilities and QOL for Students and personnel
- ❖ Doing The Right Things and Wining Awards

August 8-11, 2004


33



BENEFITS TO COMED/AMERESCO

- ❖ Federal Government Reference Site
- ❖ Additional Revenue and Profit Source
- ❖ Co-Developed A Repeatable Process
- ❖ True Partnership Arrangement

August 8-11, 2004
34



LESSONS LEARNED

- ❖ Good Partnership is Critical to the Success of the Process
- ❖ Incorporate all stakeholders early
- ❖ Stress the Importance of continued payment by reimbursable customers
- ❖ Involve Senior Management
- ❖ Be Critical from Assessment Through Implementation
- ❖ Communication
- ❖ Expediting the Procurement and Delivery Process is Possible!

August 8-11, 2004
35
